

Search History

STN
(HCAPIUS, INSPEC, JAPLO, USPAT4U)
3/29/05

=> d 18 1-4 abs,bib

L8 ANSWER 1 OF 4 USPATFULL on STN

AB With respect to a **liquid phase growth** method for a **silicon crystal** in which the **silicon crystal** is grown on a **substrate** by immersing the **substrate** in a **solvent** or allowing the **substrate** to contact the **solvent**, a gas containing a **raw material** and/or a **dopant** is supplied to the solvent after at least a part of the gas is decomposed by application of energy thereto. In this manner, a **liquid phase growth** method for a **silicon crystal**, the method capable of achieving continuous growth and suitable for mass production, a manufacturing method for a solar cell and a **liquid phase growth** apparatus for a **silicon crystal** are provided.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AN 2004:86293 USPATFULL

TI **Liquid phase growth** method for **silicon crystal** manufacturing method for solar cell and **liquid phase growth** apparatus for **silicon crystal**

IN Nishida, Shoji, Nara, JAPAN
Yoshino, Takehito, Nara, JAPAN
Iwane, Masaaki, Nara, JAPAN
Mizutani, Masaki, Nara, JAPAN

PA CANON KABUSHIKI KAISHA, Tokyo, JAPAN (non-U.S. corporation)

PI US 2004065251 AI 20040408

AI US 2003-676094 AI 20031002 (10)

PRAI JP 2002-294897 20021008

DT Utility

FS APPLICATION

LREP FITZPATRICK CELLA HARPER & SCINTO, 30 ROCKEFELLER PLAZA, NEW YORK, NY, 10112

CLMN Number of Claims: 33

ECL Exemplary Claim: 1

DRWN 5 Drawing Page(s)

LN.CNT 964

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L8 ANSWER 2 OF 4 USPATFULL on STN

AB Provided are a **liquid phase growth** method of **silicon crystal** comprising a step of injecting a source gas containing at least silicon atoms into a solvent to decompose the source gas and, simultaneously therewith, dissolving the silicon atoms into the solvent, thereby supplying the silicon atoms into the solvent, and a step of dipping or contacting a **substrate** into or with the **solvent**, thereby growing a **silicon crystal** on the substrate; and a method of producing a solar cell utilizing the aforementioned method. Also provided is a **liquid phase growth** apparatus of a **silicon crystal** comprising means for holding a solvent in which **silicon** atoms are dissolved, and means for dipping or contacting a **substrate** into or with the **solvent**, the apparatus further comprising means for injecting a source gas containing at least silicon atoms into the solvent. These provide a **liquid phase growth** method of a **silicon crystal** and a production method of a solar cell each having high volume productivity and permitting continuous growth.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

10/20/97

AN 2002:211323 USPATFULL
TI **Liquid phase growth** method of
silicon crystal, method of producing solar, cell, and
liquid phase growth apparatus
IN Nishida, Shoji, Kanagawa-ken, JAPAN
Nakagawa, Katsumi, Kanagawa-ken, JAPAN
Ukiyo, Noritaka, Kanagawa-ken, JAPAN
Iwane, Masaaki, Kanagawa-ken, JAPAN
PI US 2002112660 A1 20020822
AI US 2002-120357 A1 20020412 (10)
RLI Division of Ser. No. US 1998-208377, filed on 10 Dec 1998, GRANTED, Pat.
No. US 6391108
PRAI JP 1997-342709 19971212
DT Utility
FS APPLICATION
LREP FITZPATRICK CELLA HARPER & SCINTO, 30 ROCKEFELLER PLAZA, NEW YORK, NY,
10112
CLMN Number of Claims: 31
ECL Exemplary Claim: 1
DRWN 4 Drawing Page(s)
LN.CNT 614
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L8 ANSWER 3 OF 4 USPATFULL on STN
AB Provided are a **liquid phase growth** method
of **silicon crystal** comprising a step of injecting a
source gas containing at least silicon atoms into a solvent to decompose
the source gas and, simultaneously therewith, dissolving the silicon
atoms into the solvent, thereby supplying the silicon atoms into the
solvent, and a step of dipping or contacting a **substrate** into
or with the **solvent**, thereby growing a **silicon**
crystal on the substrate; and a method of producing a solar cell
utilizing the aforementioned method. Also provided is a **liquid**
phase growth apparatus of a **silicon**
crystal comprising means for holding a solvent in which
silicon atoms are dissolved, and means for dipping or contacting
a **substrate** into or with the **solvent**, the apparatus
further comprising means for injecting a source gas containing at least
silicon atoms into the solvent. These provide a **liquid**
phase growth method of a **silicon**
crystal and a production method of a solar cell each having high
volume productivity and permitting continuous growth.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AN 2002:10790 USPATFULL
TI **LIQUID PHASE GROWTH METHOD OF**
SILICON CRYSTAL, METHOD OF PRODUCING SOLAR CELL, AND
LIQUID PHASE GROWTH APPARATUS
IN NISHIDA, SHOJI, HIRATSUKA-SHI, JAPAN
NAKAGAWA, KATSUMI, ATSUGI-SHI, JAPAN
UKIYO, NORITAKA, ATSUGI-SHI, JAPAN
IWANE, MASAOKI, ATSUGI-SHI, JAPAN
PI US 2002005158 A1 20020117
US 6391108 B2 20020521
AI US 1998-208377 A1 19981210 (9)
PRAI JP 1997-342709 19971212
DT Utility
FS APPLICATION
LREP FITZPATRICK CELLA HARPER & SCINTO, 30 ROCKEFELLER PLAZA, NEW YORK, NY,
10112
CLMN Number of Claims: 31
ECL Exemplary Claim: 1
DRWN 4 Drawing Page(s)

LN.CNT 614

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L8 ANSWER 4 OF 4 USPAT2 on STN

AB Provided are a **liquid phase growth** method of **silicon crystal** comprising a step of injecting a source gas containing at least silicon atoms into a solvent to decompose the source gas and, simultaneously therewith, dissolving the silicon atoms into the solvent, thereby supplying the silicon atoms into the solvent, and a step of dipping or contacting a **substrate** into or with the **solvent**, thereby growing a **silicon crystal** on the substrate; and a method of producing a solar cell utilizing the aforementioned method. Also provided is a **liquid phase growth** apparatus of a **silicon crystal** comprising means for holding a solvent in which **silicon** atoms are dissolved, and means for dipping or contacting a **substrate** into or with the **solvent**, the apparatus further comprising means for injecting a source gas containing at least silicon atoms into the solvent. These provide a **liquid phase growth** method of a **silicon crystal** and a production method of a solar cell each having high volume productivity and permitting continuous growth.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AN 2002:10790 USPAT2

TI **Liquid phase growth** method of **silicon crystal**, method of producing solar cell, and **liquid phase growth** apparatus

IN Nishida, Shoji, Hiratsuka, JAPAN
Nakagawa, Katsumi, Atsugi, JAPAN
Ukiyo, Noritaka, Atsugi, JAPAN
Iwane, Masaaki, Atsugi, JAPAN

PA Canon Kabushiki Kaisha, Tokyo, JAPAN (non-U.S. corporation)

PI US 6391108 B2 20020521

AI US 1998-208377 19981210 (9)

PRAI JP 1997-342709 19971212

DT Utility

FS GRANTED

EXNAM Primary Examiner: Utech, Benjamin L.; Assistant Examiner: Anderson, Matthew

LREP Fitzpatrick, Cella, Harper & Scinto

CLMN Number of Claims: 18

ECL Exemplary Claim: 1

DRWN 4 Drawing Figure(s); 4 Drawing Page(s)

LN.CNT 552

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

=> d his

(FILE 'HOME' ENTERED AT 13:31:15 ON 29 MAR 2005)

FILE 'HCAPLUS, INSPEC, JAPIO, INPADOC, USPATFULL, USPAT2' ENTERED AT 13:31:58 ON 29 MAR 2005

L1 27937 S (LPE OR LIQUID(W) PHASE(W) EPITAX? OR LIQUID(W) PHASE(W) GROW?)
L2 193444 S (SI OR SILICON) (8A) (CRYSTAL?)
L3 114745 S (SUBSTRATE#) (6A) (SOLVENT# OR LIQUID#)
L4 178185 S (DOPANT#)
L5 21222 S (DECOMPOSIT? (4A) GAS?)
L6 338325 S (RAW(W) MATERIAL#)
L7 4630569 S (METAL#)
L8 4 S L1 AND L2 AND L3 AND L4 AND L5 AND L6 AND L7

George K. Ny
(714) 540-8700

11/7/94
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10/676,094

Finalize Restriction

Examiner's Notes

*Priority document JP-2002-294897 filed on 10/8/2002.

- s (LPE or liquid(w) phase(w) epitaxy)
- s (Si or silicon) (sa) (crystal?)
- s (Substrate #) (sa) (solvent for liquid #)
- s (deposit #)
- s (decomposit? (ta) gas?)
- s (raw(w) material/#)
- s (metal #)

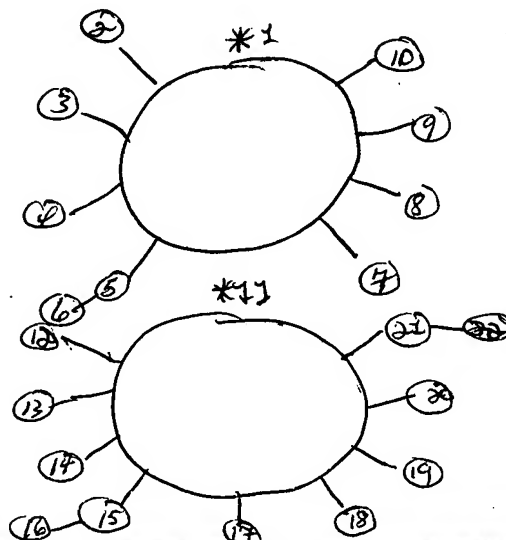
- 11272 Rej
- Claim 1, lines 1 and/or "
 - Claim 2, lines 3, 4, 6, 8 "and/or"
 - Claim 4, line 2 "in and/or"
 - Claim 12, lines 3, 4 "and/or..."
 - Claim 14, line 3, "and/or"
 - Claim 13, lines 3, 4, + 6 "and/or..."
 - Claim 14, lines 2, 3 "...a-type..."

ODP Rej:

Claim 1-18 of U.S. Pat. No. 6,391,108 to Nishida, et al
over claims 1-23 of 10/676,094

ODP Rej:

Claims 1-20 of U.S. Appl 10/120,357 over claims 1-23 of U.S. Appl 10/676,094.



8.08 1) $[51-22\text{are}]$

2) $[5]$ A liquid phase growth method & a manufacturing method for a solar cell

M+D
I

3) $[117]$

4) $[54+]$

5) $[523-33\text{are}]$

6) [A liquid phase growth apparatus for a Si crystal]

APP 8.09 7) $[523-33\text{are}]$

II

8) [A liquid phase growth apparatus for a Si crystal]

117/100%

3) $[117]$

4) $[200]$

M+D → APP

~~APP~~

~~APP~~